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ABSTRACT

The relationship between teacher characteristics and classroom behavior and the academic achievement of students is examined. Observation focused upon the effect of specific teacher behaviors on student time-on-task in the classroom. It was posited that time-on-task produces gains in achievement, coping skill, self-esteem, and general attitude on the part of the student. Teacher characteristics and classroom behaviors were used to predict student time-on-task. An analysis of results of a year's observation of one sixth-grade class indicated that teacher characteristics do affect children's work habits, in expectable ways, and children's work habits, in turn, affect their learning, self-esteem, and broad coping skills. (JD)

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TRACING TEACHER EFFECTS THROUGH STUDENT BEHAVIOR TO LEARNING OUTCOMES

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TRACING TEACHER EFFECTS THROUGH STUDENT
BEHAVIOR TO LEARNING OUTCOMES

A three-step chain was studied: teacher characteristics and teacher classroom behavior which may affect student Time-on-Task (TOT), which may, in turn, affect student learning outcomes. Nine teacher self-report scores and three observer ratings (Ryans' factors) were regressed on observer-coded TOT. TOT was then regressed on six outcome measures, adjusting for pretest level. Linear and quadratic terms were included. Systematic, organized teaching and self-rated teacher Efficiency and positive Attitude (two scales) predicted student TOT. TOT predicted positive gain in achievement, coping skill, self-esteem, and general attitude. Most effects were curvilinear; high TOT had the strongest effects.

TRACING TEACHER EFFECTS THROUGH
STUDENT BEHAVIOR TO LEARNING OUTCOMES

Teachers' personal characteristics and their teaching behavior are commonly believed to affect student learning, attitudes, self-esteem and coping skills. Some empirical evidence has already been reported (Peck, Manning, and Buntain, 1977), however the results are equivocal. Through what mediating processes, if any, these effects operate has not been clearly established.

Few, if any, studies have been able to afford the multiple presage measures, process measures, and outcome measures necessary to effectively address these questions. They are built into the design of the Teaching-Learning Interaction (TLI) study and research program at the R&D Center for Teacher Education; and, into the parallel "Junior High School Study," based on the same precursor conceptual model, which is a part of the Correlates of Effective Teaching program at the Center. The present report concerns one facet of the TLI research, an examination of a model of a two-link causal chain. This chain starts at the beginning of the year with measures of certain teacher characteristics and observation-based measures of teaching behavior. The second component of the chain consists of an observer-coded measure of student Time-on-Task behavior (TOT) during the year. Finally, the chain ends with the assessment of regressed change on the following student outcomes: achievement, attitudes towards school and life in general, coping skills, and self-esteem. Regressed change refers to the posttest being adjusted for the pretest.

Student Time-on-Task was selected as a promising intervening variable, following the work of Carroll (1967) and Bloom (1974). Carroll's model of school learning postulated that learning is a function of the time applied to it. Bloom conceptualized this as "time-on-task." Bloom reported a number of studies that indicate that time-on-task strongly predicts learning. The studies seem to show that while initial time-on-task behavior in a new learning situation is predictable with aptitude tests that reflect previous learning, later in a course, time-on-task behavior is best predicted by the student's success on earlier units in the course, by his or her interest, and by the "quality of instruction" provided. Each of the studies, however, did not access any consequences apart from academic learning, such as effects on self-esteem, on attitude toward school, or on more generalized coping skills.

Harnischfeger and Wiley (1975) presented a further-elaborated paradigm for studying student use-of-time and the consequences. Carver (1970) found learning time correlated with achievement when aptitude was controlled. Hoffman (1974) found that residential treatment (primarily of affective problems) of emotionally disturbed children significantly improved their "undergirding skills," their time-on-task, their task concentration, and their subsequent academic gain.

Husen (1972) tentatively concluded, from the large-scale International Association for the Evaluation of Educational Achievement (IEA) Study, that the gross amount of time children spend in school probably does not determine their learning. Weber, (1968) in an experiment with college students, found greater class time allotments actually were counterproductive. Jarvis (1962), though, in a study of 700 sixth-graders found longer class periods resulted in higher student achievement in both arithmetic and language.

It seems likely that much more can be discovered about the importance of time-on-task, what affects it, and what effects it has, if we study the classroom activities of teachers and their students rather than use gross measures of class time or school-year length. In this way, the interacting effects of teacher and student characteristics on student time-on-task could be tracked, and the consequences on schooling outcomes of time-on-task behavior could be investigated. One aspect of the current Teaching-Learning Interaction Study is just such an investigation. It is desgined to study ways in which teacher and student characteristics interact to affect several student outcomes. The design replicates the analysis on several samples.

This paper examines a two-link conceptual model in which teacher characteristics and teacher classroom behaviors are used to predict student Time-on-Task and student Time-on-Task, in turn, is used to predict regressed change on the student outcomes. If this model is supported in terms of the proposed relationships then we have identified one of the important processes through which teacher characteristics and teacher classroom behavior affects learning outcomes.

The sample with which this paper dealt consisted of 53 sixth grade teachers and a subsample of their students from tri-ethnic schools in Austin, Texas. The 408 Anglo, Black, and Chicano students were randomly assigned to classrooms and proportionately represented the tri-ethnic population of the community.

Teacher personal characteristic measures included nine self-report scales on personality traits [7 scales from the Adjective Self-Description which consists of Likert type items (test-retest reliability .80 - .92) and 2 from the Views of Teaching instrument (Coping, .73 test-retest; Attitude, .53 test-retest)]. Teacher classroom behavior was assessed by observer ratings on Ryans' 20 Classroom Observation Record (COR) scale. In rating the teachers, the observers were unaware of the factor structure of the instrument. Nevertheless, subjecting the ratings to factor analysis reproduced the three factors reported by Ryans, Kindly-understanding (KU), Systematic-organized (SO), and Stimulating-inventive (SI). Factor scores for each teacher, derived from four observers' ratings, averaged across two or three occasions, proved highly reliable.

Time-on-task was recorded once each minute, during several observation periods, for each student. Each student's percentage of time-on-task (TOT) for all periods he or she was observed, constituted his or her TOT score. Inter-coder, intra-class reliability for TOT was .87 for four observers on three occasions, observing 78 students.

Student outcomes consisted of regressed change from the beginning to the end of the year on measures of standardized achievement, attitudes towards school and life in general, coping skills, and self-esteem.

A general linear models approach was used to examine the relationships. In the first step, teacher characteristics (ASD, VOT) and teaching behavior (COR KU, COR SO, COR SI) were used as predictors of student Time-on-Task. Both linear and quadratic terms were included in this regression analysis to test for curvilinear relationships.

The second step was to compute the relationship of student Time-on-Task to regressed change on each of the student outcome measures. Again, linear and quadratic components were included. The full model for this analysis is:

$$Y = U + X + P + P^2 + XP + XP^2$$

where Y is the student outcome measure, X is the student pretest, and P is the time-on-task predictor.

Of the 12 teacher measures tested for linear and curvilinear relationships with student Time-on-Task, four showed significant effects. Self-rated (ASD) teacher efficiency was positively related to student TOT as was

a moderate rather than extreme behavior score for prudence, responsibility, and courtesy. There was a curvilinear relationship of teacher attitude (VOT) to student TOT. The greatest facilitation was produced by teachers with the most positive scores. And finally, Systematic-organized classroom behavior by the teacher (as recorded by the observers) was strongly related to student Time-on-Task.

Student Time-on-Task showed six significant relationships, either linear or curvilinear with regressed change on the student outcome measures. TOT had a positive effect on (SSC) Attitude improvement. There was both a linear effect and a curvilinear component; high TOT has a much stronger effect on attitude change than low or average TOT.

Coping skill gains (SSC-Coping) were both linearly and curvilinearly affected by Time-on-Task in a positive direction. The greatest gain in coping skills was associated with the highest level of TOT during the year.

Time-on-Task had a positive influence on self-esteem. Working consistently during the school year led to maintained or improved self-esteem whereas low TOT behavior led to losses in self-esteem.

Time-on-Task affected standardized achievement in a curvilinear fashion. The highest TOT was conducive to the greatest gain. The largest difference in gain was between students who showed high and medium TOT behavior.

Thus on three different outcomes (coping, attitudes, and achievement) a high level of TOT made a much larger difference in outcome than medium or low levels of TOT had produced. An average amount was better than a low amount of TOT behavior, but the largest and most positive effects were associated with consistently high TOT behavior.

While this is a simple kind of analysis, using just one of the four samples in the study, the results do lend support to the proposition forwarded by Carroll, Bloom and others that there is a causal chain that links teacher characteristics and teacher classroom behavior to student learning behavior, and that student Time-on-Task, in turn, has predictable effects on both cognitive and affective outcomes over the school year. Both teacher managerial skill and teacher attitudes show significant effects on student Time-on-Task behavior. In turn, that Time-on-Task behavior positively influences student attitude and self-esteem, as well as gains in achievement

and in generalized coping skills. COR-SO, which strongly predicted TOT, also predicted Attitude, Coping, and Achievement regressed change over the year.

Based on these results, we must agree with Cronbach (1975) who said that neither an overly simplified search for a general "main effect" law of relationship, nor a simplistic form of statistical analysis, will be adequate to uncover the true facts of the case. The majority of the significant links between teacher and student behavior, and between student study habits and learning outcomes, involve complex interaction effects and a good many curvilinear relationships.

The overall conclusion is that teacher characteristics do affect children's work habits, in expectable ways, and children's work habits, in turn, affect their learning, their self-esteem and their broad coping skills.

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